REMARKS

This application has been carefully reviewed in light of the Office Action dated November 30, 2004. Applicant has amended claims 3, 4, 14, and 15. Reconsideration and favorable action in this case are respectfully requested.

The Examiner has rejected claims 1- 24 under 35 U.S.C. §103(a) as being unpatentable over EP No. 0683451A2 to Sunakawa et al in view of U.S. Pat. No. 5,894,579 to Fujihara. Applicants have reviewed these references in detail and do not believe that they disclose or make obvious the invention as claimed.

Applicants have re-read the Sunakawa reference in detail, and have attempted to attribute the broadest reasonable reading to its teaching. Even with a broad reading of the teachings of Sunakawa, Applicants remain convinced that it does not teach the present invention and, in fact, is directed to a much different invention. The combination of Sunakawa with Fujihara does nothing to resolve the differences between the present invention and Sunakawa.

To reiterate from the previous response, the Sunakawa reference shows multiple ways in which a system can reduce power by placing various devices, such as an I/O system, in a reduced power state. In a first embodiment, a task which uses one or more devices with the largest power consumption is given a higher priority in order to complete the task in a shorter period of time. When multiple tasks are being executed, the higher priority task is provided with more execution cycles relative to the other tasks. This is shown in greater detail in connection with Figures 5A and 5B of Sunakawa. By providing more execution cycle to the task that uses the highest power devices, the task will be completed sooner than it would if it received a proportional set of execution cycles with the other current tasks. In Figure 5A, where tasks A, B and C are executed using equal, alternating processing cycles, I/O unit C is powered from time "0" to "t2" (t2 is equal to t1 - the time necessary to complete task C using equal alternating execution

cycles – plus t_{idle} – the time for I/O unit C to power down after the start of a period of inactivity). In Figure 5B, task C is given two execution cycles for every execution cycle given to task A or task B; hence, task C completes at t3 (where t3 < t1). Accordingly, I/O unit C can power down by t4 (where t4 < t2). By completing the high priority task in a shorter time, power to the device (or devices) can be turned off earlier, thereby reducing the power consumed by the device (page 10, lines 8-30).

Sunakawa discloses other embodiments directed towards turning a device on or off during execution of a task. In a second embodiment, initiating a device pursuant to a task is delayed if turning on the device would exceed power limits (page 12, lines 1-5). In a third embodiment, increased power due to a device's transition from a high-power mode to a low-power mode is taken into consideration deciding upon whether to place the device in a low power mode once a task's access to a device is complete (page 15, lines 1-5). In a fourth embodiment, the hysteresis of intervals between accesses to the device is recorded (and averaged). This information is used in the determination of whether a device should transition to a low-power mode after the end of an access (page 15, lines 8-25). In a fifth embodiment, the transition of a hard disk drive is made with consideration of whether virtual memory is on or off (page 15, lines 29-40). In a sixth embodiment, a transition to a low power mode is made in consideration of a delay time associated with returning to a high power mode (page 15, lines 44-57).

In any of the embodiments shown in Sunakawa, a decision of how tasks are executed is not based on evaluating a *plurality of* scenarios for executing a plurality of tasks to be performed concurrently. In the embodiment of Sunakawa cited the Examiner, a decision to give a higher priority to a certain task is based upon the power consumed by the task solely according to a calculation of the total power consumed by devices accessed by the task. Not even a single scenario is calculated; the highest-consuming task is given more execution cycles without any calculation regarding whether the increased execution cycles will provide a benefit – the benefit is simply assumed.

As previously stated, the act of reducing power consumption by reducing the time needed to complete a selected task in order to turn off devices sooner will not work in many situations contemplated by the present invention. Modern day electronic systems, such as mobile telephone circuits, have real-time considerations in addition to other performance conditions, such as power and temperature considerations. These considerations cannot be met simply by modifying the execution of one task without consideration of its effect on the overall picture. For example, a mobile telephone circuit may be executing real-time and non-real time tasks, and cannot simply increase the priority of a high power consuming task at the expense of a real-time task, such as a task that processes incoming audio or video information.

Fujihara adds little, if anything, to the Sunakawa reference. In Fujihara, request to access a device are made to a FIFO (first-in-first out) queue. If a pending request would result in a total power consumption (Pnow) in excess of a predetermined power consumption threshold (Pmax), then the access request is delayed at least until a currently executed access request is completed. After a currently executed access request is completed, the pending request is reevaluated (Figure 6 and column 4, lines 40-61). The disclosure in Fujihara is essentially the same as the second embodiment of Sunakawa.

Thus, in combination, Sunakawa and Fujihara would show a system where the highest power consuming task would be given a disproportionate share of execution cycles in order to accelerate it completion; pending access requests from any task would be evaluated prior to execution to determine whether the access request would exceed a power threshold.

The present invention, as described in claims 1, 12, 23 and 24, is significantly different than the combination of Sunakawa and Fujihara. In claim 1, a *plurality of scenarios* are constructed to determine consumption information for executing a plurality

of tasks scheduled for concurrent execution. The tasks are then executed according to a selected scenario.

The steps of claim 1 are simply not shown in Sunakawa or Fujihara. Neither reference teaches the generation of multiple scenarios for executing the tasks from which one scenario is chosen. Sunakawa merely shows modifying task execution based on a single criteria. Fujihara shows a real-time decision to grant access to a device based on whether such access would result in excessive power consumption.

Accordingly, Applicants respectfully request allowance of claims 1-24.

With regard to the dependent claims, Applicants do not believe that the subject matter is shown in Sunakawa or Fujihara.

With regard to claim 3, neither Sunakawa nor Fujihara show the step of executing the tasks on said plurality of processing according to a scenario that provides the maximum performance within thermal constraints associated with the processing system. While the Examiner cites a passage specifying that it is a goal to reduce heat, there is no teaching in either reference that a scenario is chosen based on thermal constraints.

With regard to claim 4, neither Sunakawa nor Fujihara show the step of executing the tasks on said plurality of processing according to a scenario that provides the lowest possible energy consumption. While Sunakawa aims to reduce energy consumption, it does not evaluate different scenarios to determine whether consumption will in fact be reduced. Sunakawa merely assumes that energy consumption will be reduced.

With regard to claim 5, Sunakawa shows a system where each task has a table that includes a field showing a total consumption power of the devices used by the task (page 9, lines 7-28). This information is used to determine which task uses devices with the most power consumption, as described above. It does not show building different scenarios based on this information.

With regard to claim 9, Sunakawa does not show a task model including possible degradations. The passage cited by the Examiner merely shows assigning priority to the various tasks. A high priority task (such as video rendering) could have several possible degradations (such as a reduction in size, color depth, or frame rate), while a low priority task could have no possible degradations. Applicants see no correlation between priority and degradations.

With regard to claim 13, counters are used to measure activity occurrences. Nothing similar is shown in connection with the cited references.

Applicants sincerely believe that the present invention is directed to an entirely different subject matter than the Sunakawa and Fujihara references. The present invention constructs and evaluates different scenarios for executing tasks in order to meet predefined criteria. Sunakawa compares task power consumption and raises priority accordingly. Fujihara evaluates the ability of the system to accommodate a pending access request. While the goals of the references may be similar in some cases, the way in which the goals are attained is significantly different. Accordingly, Applicant respectfully requests allowance of claims 1-24.

An extension of one month is requested and a Request for Extension of Time under § 1.136 with the appropriate fee is attached hereto.

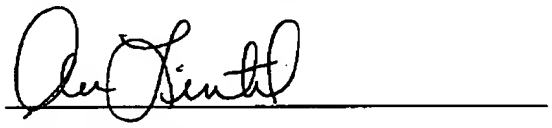
The Commissioner is hereby authorized to charge any fees or credit any overpayment, including extension fees, to Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Alan W. Lintel, Applicants'

Attorney at (972) 664-9595 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,



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